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JC13 Rec'd PCT/PTO 29 JAN 2002

FORM PTO-1390 (REV. 9-2001) U.S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371	**306.41102X00 filed January 29, 2002**
	U.S. APPLICATION NO. (If known, see 37 CFR 1.5) **10/048168**

INTERNATIONAL APPLICATION NO	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP00/06607	**July 12, 2000**	**July 30, 1999**

TITLE OF INVENTION
ENTIRELY COMBUSTIBLE INDUCTIVE PRIMER

APPLICANT(S) FOR DO/EO/US
KERN, HEINZ

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.

4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).

5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)))
   a. ☐ is transmitted hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office(RO/US)

6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).

7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.

8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

13. ☒ A FIRST preliminary amendment.

14. ☐ A SECOND or SUBSEQUENT preliminary amendment.

15. ☐ A substitute specification.

16. ☒ A change of power of attorney and/or address letter.

17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.

18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).

19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).

20. ☒ Other items or information: **Figs. 1-4, Credit Card Payment Form, PCT Request Form, International Preliminary Examination Report, International Publication No. WO 01/09563**

10048168 .061002

13 Rec'd PCT/PTO 29 JAN 2002

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
10/048168	PCT/EP00/06607	306.41102X00

21. The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492(a) (1) - (5)):

☐ Neither international preliminary examination fee (37 CFR 1 482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. **$1040.00**

☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO..... **$890.00**

☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO. **$740.00**

☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4)..... **$710.00**

☐ International preliminary examination fee (37 CFR 1 482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**

CALCULATIONS PTO USE ONLY	

ENTER APPROPRIATE BASIC FEE AMOUNT =				**$890.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				**$**	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	**$**	
Total Claims	4 - 20 =	0	x **$18.00**	**$**	
Independent Claims	1 - 3 =	0	x **$84.00**	**$**	
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)			+ **$280.00**	**$**	
TOTAL OF ABOVE CALCULATIONS =				**$890.00**	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.				**$**	
SUBTOTAL =				**$890.00**	
Processing fee of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				**$**	
TOTAL NATIONAL FEE =				**$890.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property				**$**	
TOTAL FEES ENCLOSED =				**$890.00**	
				Amount to be refunded:	**$**
				charged:	**$**

a. ☐ A check in the amount of $_____ to cover the fees is enclosed.

b. ☐ Please charge my Deposit Account No **01-2135** in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposition Account No **01-2135.** A duplicate copy of this sheet is enclosed

d. ☒ Fees are to be charged to a credit card **WARNING:** Information on this form may become public **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Antonelli, Terry, Stout & Kraus, LLP
1300 North Seventeenth Street
Suite 1800
Arlington, VA 22209
USA

SIGNATURE

Alan E. Schiavelli
NAME

32,087
REGISTRATION NO.

#4/a

306.41102X00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: KERN

Serial No.:

Filed: January 29, 2002

For: Entirely Combustible Inductive Primer

Group:

Examiner:

PRELIMINARY AMENDMENT

Assistant Commissioner
for Patents
Washington, D.C. 20231

January 29, 2002

Sir:

Prior to examination on the merits of this application and prior to calculation of the filing fee, please amend the above-identified application as follows:

IN THE CLAIMS:

Please amend the claims to read as follows:

3. (Amended) Primer according to claim 1, characterised in that a three-dimensional cylindrical coil is produced by laying the conductor ends, the ends being in one plane, one on top of the other and making a contact between them, with the remaining ends of the printed circuit traces forming the connection surfaces of the ignition bridge (4).

4. (Amended) Primer according to claim 1, characterised in that the electrical printed circuit traces (1) are preferably applied to the support material (5) using a screen-printing process and consist of silver or copper conductive paste.

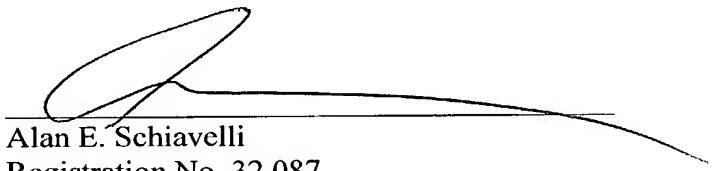
REMARKS

The foregoing amendments are respectfully requested prior to examination on the merits of this application. A marked up copy of the amended claims is attached.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 306.41102X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP



Alan E. Schiavelli
Registration No. 32,087

AES/jla
(703) 312-6600

REWRITTEN MARKED UP COPY

3. (Amended) Primer according to claim 1 ~~or 2~~, characterised in that a three-dimensional cylindrical coil is produced by laying the conductor ends, the ends being in one plane, one on top of the other and making a contact between them, with the remaining ends of the printed circuit traces forming the connection surfaces of the ignition bridge (4).

4. (Amended) Primer according to ~~one of claims 1 to 3~~ claim 1, characterised in that the electrical printed circuit traces (1) are preferably applied to the support material (5) using a screen-printing process and consist of silver or copper conductive paste.

2/pats

Entirely Combustible Inductive Primer

The invention relates to a pyrotechnic primer for igniting propellant powder for sleeveless ammunition, the primer having an ignition element and a coil, in which the energy required for triggering is transferred by electro-magnetic means (inductively).

The intensified requirement for the use of sleeveless ammunition in recent years has led increasingly to attempts at solutions comprising ignition systems which operate on the principle of transferring energy to the combustion chamber of a weapon without contact. Solutions demonstrating the principle of inductive ignition have been described in the past and their feasibility has been proved on various weapons systems.

The principal problem with previous design specifications for inductive primers has been with the non-combustible components of the receiving coil and the electrical ignition elements. This is particularly the case with relatively small calibre diameters because here unburned remains of the primer can form residues either in the cartridge chamber or in the barrel which will damage the weapon.

The object of the invention is therefore to construct a fully combustible, inductive primer with a design which is simple and economical to manufacture, which does not produce any residues harmful to the functioning of the weapon and which is suitable for universal use with all current weapon calibres.

This problem is solved according to the invention in that the ignition element and coil are placed on a

common, flat, combustible or consumable support material.
According to the invention, the entire support material of the primer consists of combustible or consumable materials such as e.g. paper or nitro-cellulose.

In a preferred embodiment, ends of conductors (printed circuit trace ends), which are in one plane, are laid one on top of the other and as a result of their contacting, a three-dimensional cylindrical coil is formed and, moreover, the remaining printed circuit trace ends forming connection surfaces (contact points) of the ignition bridge.

It is practical to apply the electrical printed circuit traces to the support material using screen-printing, the said traces consisting of silver or copper conductive paste.

The inductive primers can be of a columnar or flat design, consisting of a combustible or consumable electrical ignition element and an induction coil with several windings and any desired external geometry, which is applied to or embedded in a flat single or multi-layer, combustible, insulating support material, it being possible, also, for the electrically conductive coil material to be designed to be combustible or consumable.

It is advantageous for the entire inductive primer to be applied in one plane as a single layer or several layers onto a flexible, combustible paper or nitro-cellulose film or another combustible support layer, the entire electrical routing of the conductors or the printed circuit traces consisting, for example, of hardened

silver or copper conductive paste or another metal composition or of non-metallic combustible or consumable conducting material, which is preferably applied using screen-printing or another application process.

The advantage of the above-mentioned invention is to be found in the fact that the inductive primer consists of a single component, which only attains its function as a result of shaping and through supply of incandescent wire, dots of conductive adhesive and the detonator unit, and that it is completely combustible or consumable.

Further characteristics of the invention are to be found in the figures, which are described below.

These show:

Fig. 1 an example of fabrication of a primer according to the invention

Fig. 2 the fabrication process concerned

Fig. 3 the finished primer and

Fig. 4 an alternative example of a flat primer.

Figure 1 shows an example of fabrication of a cylindrical receiving coil on combustible support material 5 and printed circuit traces consisting of printed conductive paste with, for example, three windings but without the through-contacts in place. The coil windings 1, the through-contact points 2, the connection point 3 for the incandescent ignition wire and the incandescent wire 4 are illustrated. The

incandescent ignition wire can make the contact with the connection surfaces 3, for example, using adhesive or bonding. The geometry, conductor cross-section and number of windings can vary within a broad framework.

Figure 2 shows the fabrication process for achieving a cylindrical coil by laying the coil ends together and then making contact between the coil ends 6 via the through-contacting points 7, preferably using electrically conductive adhesive. In addition, the ends of the paper lying one on top of the other can be fixed with NC-adhesive.

Figure 3 shows the primer ready for installation. Visible are the through-contacting points 7, through whose central hole the coil ends make contact. The support material around the contact surfaces 3 can be fixed in a suitable position in the ignition chain because of its flexibility and connected to a suitable combustible container to hold the ignition material e.g. using adhesive.

Figure 4 shows an example of the fabrication of a flat receiving coil on combustible support material 1 and printed circuit traces made of printed conductive paste with, for example, ten windings. The coil windings 2, the through-contact points 3, the printed circuit traces on the back 4 of the support material and the connection point of the incandescent ignition wire 5 can be seen. The geometry, conductor cross-section and number of windings can vary within a broad framework.

Description of Functioning

When a pulse current impinges on a primary coil on the weapon side is struck by a pulse of current, an alternating magnetic field is generated and a voltage is induced in the coil of the inductive ignition element, which drives a current because of the electrical resistance of the incandescent wire, which, as a result of conversion into Joulean heat, causes ignition of the detonator unit and thus ignites the propellant powder. All the components of the primer are burned or consumed during this process.

Patent Claims

1. Pyrotechnic primer for igniting propellant powder for sleeveless ammunition, the primer having an ignition element (4) and a coil (1) in which the energy required for triggering is transferred by electromagnetic means (inductively), characterised in that the ignition element (4) and the coil (1) are situated on a common, flat, combustible or consumable support material (5).

2. Primer according to claim 1, characterised in that the entire support material (5) of the primer consists of combustible or consumable materials, such as e.g. paper or nitro-cellulose.

3. Primer according to claim 1 or 2, characterised in that a three-dimensional cylindrical coil is produced by laying the conductor ends, the ends being in one plane, one on top of the other and making a contact between them, with the remaining ends of the printed circuit traces forming the connection surfaces of the ignition bridge (4).

4. Primer according to one of claims 1 to 3, characterised in that the electrical printed circuit traces (1) are preferably applied to the support material (5) using a screen-printing process and consist of silver or copper conductive paste.

ABSTRACT

The invention relates to a pyrotechnical primer for igniting propellant powder for sleeveless ammunition. The primer comprises an igniting element (4) and a coil (1). The energy required for triggering is transmitted in an electromagnetic manner (inductively). The aim of the invention is to produce a cost-effective, entirely combustible, inductive primer which is easy to produce and is not provided with residues that damage the functioning of the weapons. The air of the invention is also to provide said primer with such a base construction that the primer can be used in all conventional weapons calibres. To this end, the ignition element (4) and the coil (1) are located on a mutual, flat, combustible consumable or support material. (5).

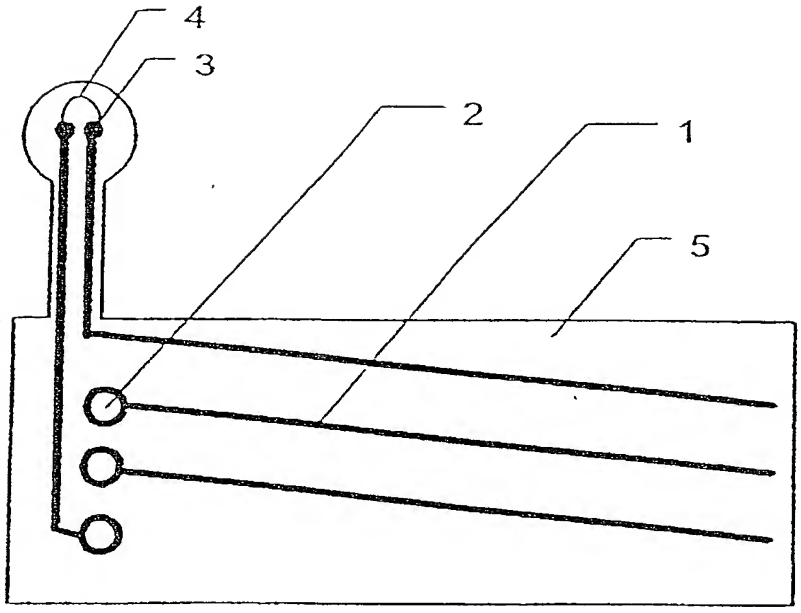


Fig.1

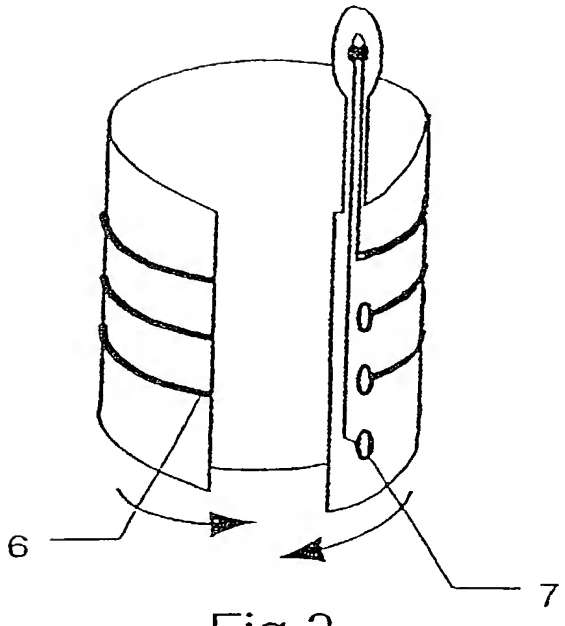


Fig.2

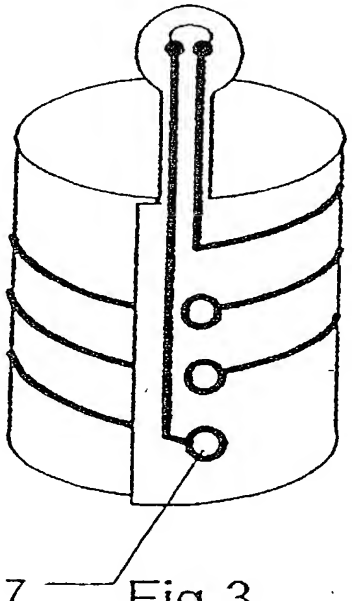


Fig.3

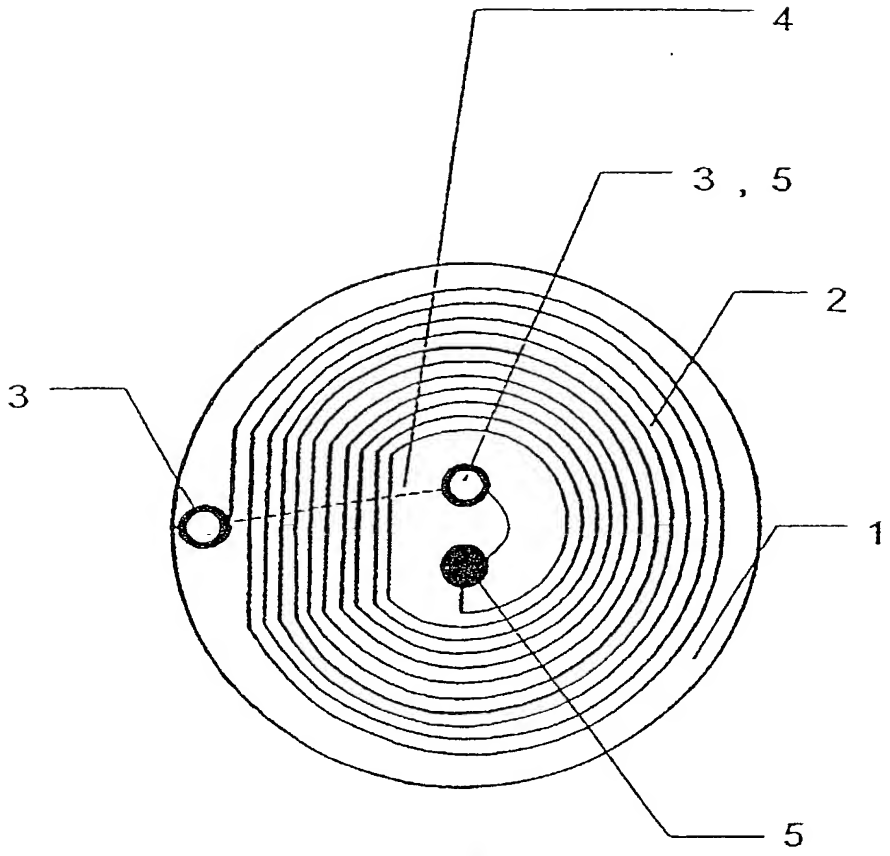


Fig.4

#6

Attorney's Docket No.: 306.41102X00

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that: my residence, post office address and country of citizenship are as stated below, next to my name; I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

ENTIRELY COMBUSTIBLE INDUCTIVE PRIMER

the specification of which

___ is attached hereto.

_X_ was filed on January 29, 2002 as
United States Application Number 10/048,168
or PCT International Application Number PCT/EP00/06607
and was amended on _____.
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Claimed	
199 36 095.2 (Number)	Germany (Country)	30/July/1999 (Day/Month/Year Filed)	___ Yes	___ No
199 56 635.6 (Number)	Germany (Country)	25/November/1999 (Day/Month/Year Filed)	___ Yes	___ No

I hereby claim the benefit under title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below

_____ _____
(Application Number) Filing Date

_____ _____
(Application Number) Filing Date

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

10048168 .061002

(Application Number) Filing Date (Status -- patented, pending, abandoned)

(Application Number) Filing Date (Status -- patented, pending, abandoned)

(11) I hereby appoint: Donald R. Antonelli, Reg. No. 20,296; Melvin Kraus, Reg. No. 22,466; William I. Solomon, Reg. No. 28,565; Gregory E. Montone, Reg. No. 28,141; Ronald J. Shore, Reg. No. 28,577; Donald E. Stout, Reg. No. 26,422; Alan E. Schiavelli, Reg. No. 32,087; James N. Dresser, Reg. No. 22,973; Carl I. Brundidge, Reg. No. 29,621; Paul J. Skwierawski, Reg. No. 32,173; and Robert M. Bauer, Reg. No. 34,487, my attorneys; of ANTONELLI, TERRY, STOUT & KRAUS, LLP with offices located at 1300 North Seventeenth Street, Suite 1800, Arlington, Virginia 22209, telephone: (703) 312-6600, fax: (703) 312-6666; with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

Send all correspondence to:

Customer Number 020457
ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 North Seventeenth Street
Suite 1800
Arlington, VA. 22209

Direct all telephone calls and faxes to:

TEL: (703) 312-6600
FAX: (703) 312-6666

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-00

Full Name of Sole/First Inventor Heinz KERN

Inventor's Signature _____ Date 14.05.02

Residence Same as P.O. Box Address (City, State) Citizenship (Country)

Post Office Address Irisweg 29, D-90768, Fürth, Germany DEX

Full Name of Second/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ (City, State) Citizenship _____ (Country)

Post Office Address _____

Full Name of Third/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ Citizenship _____

(City, State) (Country)

Post Office Address _____

_____

Full Name of Fourth/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ Citizenship _____

(City, State) (Country)

Post Office Address _____

_____

Full Name of Fifth/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ Citizenship _____

(City, State) (Country)

Post Office Address _____

_____

Full Name of Sixth/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ Citizenship _____

(City, State) (Country)

Post Office Address _____

_____

Full Name of Seventh/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ Citizenship _____

(City, State) (Country)

Post Office Address _____

_____

Full Name of Eight/Joint Inventor _____

Inventor's Signature _____ Date _____

Residence _____ Citizenship _____

(City, State) (Country)

Post Office Address _____

_____

Full Name of Ninth/Joint Inventor

Inventor's Signature _____ Date _____

Residence _____ Citizenship _____

(City, State) (Country)

Post Office Address _____

_____

Full Name of Tenth/Joint Inventor

Inventor's Signature _____ Date _____

Residence _____ Citizenship _____

(City, State) (Country)

Post Office Address _____

_____

Title 37, Code of Federal Regulations, Section 1.56
Duty to Disclose Information Material to Patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section The duty to disclosure information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclosure all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by ¤¤1 97(b)-(d) and 1 98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine.

(1) Prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made or record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.